



**NATIONAL HIV/AIDS SECRETARIAT**

**HEALTH SECTOR RESPONSE**

# **GUIDELINES**

For

## **The Safe Management Of Healthcare Waste in Sierra Leone**

**AUGUST 2003**

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## **Objectives of the guidelines**

These guidelines are designed for use by Policymakers, Hospital managers and staffs of both private and public healthcare facilities, at the national, regional, district and villa/PHU levels.

They are written as a practical guide for the safe management of healthcare waste in urban, peri-urban, and rural areas of Sierra Leone and, more specifically, the decision-making process for choosing adequate options for safe management of healthcare wastes.

This guide addresses the choice of a treatment and disposal option for wastes from healthcare facilities, in order to prevent negative health impacts on staff, patients, visitors, public and the environment.

These guidelines are expected to standardise safe management of healthcare wastes and ensure the standard of service delivery meeting basic international requirements. All Healthcare Facilities in Sierra Leone must adhere to these guidelines.

## 1.0 Definitions and Classification of Healthcare Wastes

Healthcare waste includes all waste generated by healthcare establishments, research facilities, and laboratories. In addition, it includes the waste originating from “minor” or “scattered” sources – such as that produced in the course of health care undertaken in the home (dialysis, insulin injections, etc.). These residues can be more or less hazardous depending on their origin within the hospital.

According to W. H. O.; from the total of wastes generated by healthcare facilities, almost 80% are general waste comparable to domestic waste. It comes mostly from the administrative and housekeeping functions of healthcare establishments and may also include waste generated during maintenance of healthcare premises. The remaining approximately 20% of wastes are regarded as hazardous materials that may be infectious, toxic or radioactive and may create a variety of health risks.

The correct treatment of healthcare waste must be based upon consideration of various aspects, including the health and safety of all persons within the hospital (staff, patients and visitors), and the protection of the population outside the hospital from contagious diseases. The specific physical and or chemical properties of the waste with regard to its potential to harm the environment must also be considered.

Consequently, healthcare wastes may be classified into groups based on the management techniques which experience have shown are appropriate in each case. Thus, depending on the **kind of treatment** they require, **healthcare waste in Sierra Leone can be classified as follows:**

### **Type A: Normal Waste**

This is waste similar to domestic waste and not requiring any special treatment. This is the waste produced by the hospital administration, the cleaning service, the kitchens, stores and workshops.

### **Type B: Patients' Waste**

Waste that requires special handling within the hospital. The aim of such handling is to prevent dispersal of pathogens within the hospital, since these are potentially able to infect persons whose resistance has already been diminished due to illness, advanced age, stress, trauma, lesions, etc. This risk is being aggravated by the concentration of germs in certain areas. Outside the hospital, these wastes can be handled similarly to those of Type A. This

waste type generally derives from normal inpatient wards; outpatient examinations room, and first aid areas.

**Type C: Infectious Waste**

Waste that requires special handling inside and outside the hospital. This group comprises all waste from isolation wards in which patients with highly infectious diseases are accommodated and infectious residues from clinical laboratories for microbiological investigations.

This category of waste also includes all disposable waste from all hospital areas that constitute a real risk of infection when being disposed of, such as needles and sharp objects and objects that are covered with blood or human secretion.

**Type D: Human Parts**

This waste type requires special treatment, not so much to prevent infections, but rather for ethical reasons. This group comprises parts of human bodies generated in operating theatres, delivery rooms, morgues, autopsies, etc.

Examples are organic tissue, placentas and amputated limbs.

**Type E: Other Hazardous Waste**

This group covers waste types that, for legal reasons or because of their physical or chemical properties necessitate special handling.

Hospitals provide a service and hence have technical infrastructures that can also generate hazardous wastes similar to industrial wastes.

This type also includes radioactive material that may also be handled by authorised personnel, and other wastes classified by legal regulations as hazardous.

**Type F: Recyclable Material**

Non-contaminated materials from the administration, stores, and workshops and so on, should be recycled or reused for reasons of environmental protection.

**Type G: Sludge from the Hospital Wastewater Treatment Plant**

This sludge can be heavily contaminated and requires additional treatment before being disposed of.

**2.0 Segregation and Collection**

Every site within the HEALTHCARE FACILITY at which waste is generated must be equipped with a sufficient number of waste containers, and emphasis should be placed on the need to segregate “risk waste” from other waste, and to use appropriate packaging and marking.

Healthcare facility wastes Types B and C should always be collected in disposable receptacles that meet the following requirements.

- Leak-resistant
- Impervious to moisture
- Of sufficient strength to prevent tearing or bursting under normal conditions of use and handling
- Non-transparent
- Seal-able to prevent transmission of micro-organisms

Polythene bags with a minimum thickness of 100 microns and a size of approx. 60cm x 100cm fulfil these conditions. The filled bags are closed off using a plastic strip, which, once fastened in place, cannot be reopened. It is then removed from the bag holder and placed at the transfer area for its removal by the collection service/waste handler in cases of on-site disposal.

Sharp and pointed objects (syringes, scalpel blades, etc.) should be placed in cut- and puncture-resistant containers, such as disposable plastic bottles or cardboard boxes.

Neither re-use of the disposable receptacles nor is compression of the waste permissible.

For Type D waste, the receptacles should be placed directly in the area where the waste is generated. They must then be sealed and deposited in the corresponding transfer area.

The transfer or storage areas should be set apart from other facilities, be sufficiently well ventilated, and have sanitary facilities for personnel to wash and disinfect their hands.

**3.0 Transportation and Storage within the Hospital**

The waste should be removed each day from the transfer areas and taken to a storage place or final disposal site. This must be done with care in order to

prevent the rupturing or opening of the bags, resulting in release of harmful pathogens into the environment.

Waste of Types A and B, once from within the Healthcare facility, can be treated as domestic wastes.

Waste of Types C and D must be transported to a special storage room. This depot must be situated so as not to affect other facilities of the hospital, such as kitchen, laundry, wards, etc. in anyway. It must take the form of an enclosed space to which only authorized personnel have access.

The waste stored in the depot must be picked up daily, and the depot area must be washed out afterwards each time. The carts used for internal transport of the waste must also be regularly cleaned and disinfected.

#### **4.0 Transportation outside the Hospital**

Waste belonging to the Types A and B can be transported by the same service that collects municipal household waste or the waste handler in the case of on-site disposal.

If waste Type C is not treated and disinfected in the hospital area, this waste must be transported by special collection tours. The vehicles used for this transportation can be of varying standards, according to the destination of the waste.

**(a) Transport to a central treatment plant:**

It is recommended to transport the infectious waste to the central treatment plants in specially designed vehicles which do not compress the waste and which have equipment that prevents the bags from sliding around during transport. The interior of the vehicle must be easy to clean and the floors have raised edges to retain any liquids that may escape from the bags, and it must be adequately ventilated.

**(b) Transport to a sanitary landfill site:**

In the case that the infectious waste is not to be transported to a central treatment plant but directly to the sanitary landfill site for burying in restricted areas; transport can be carried out in a different way. In the special case where the bags with the waste no longer have to be manipulated by personnel but can be dumped directly onto the prepared excavations, transportation can be done by normal waste collection trucks.

Healthcare facility wastes Type D (human body parts and deceased fetuses) should be sealed in plastic containers or plastic bags, which can be transported

in the special vehicles, designed for transport of wastes Type C or in any other pick-up or delivery van that is suitable.

## **5. Medical waste treatment methods**

Studies carried out recently have shown that common patients' waste, with the exception of that from patients with infectious-contagious diseases, is no more contaminated with micro-organisms than domestic waste, which means that its transport and final disposal does not pose a major risk to the health of the general community outside the hospital.

Accordingly, in the case of the waste included in Types A and B, there is no sanitation-related reason for not transporting and disposing of them together with other urban waste, once they have been removed from the Healthcare facility premises.

In contrast, the waste types included in groups C and D, namely infectious and human parts, definitely require special management and handling from their production all the way to their final disposal, including treatment which ensures elimination of their harmful properties in order to minimise the risk of contamination and infection.

The terms "sterilisation", "disinfection" and "decontamination" are used in discussions of medical waste. They need to be precisely defined in any regulation:

Sterilization denotes the killing of all living organism in a material. If it is done thermally, it needs temperatures over 134°C and is, in the opinion of experts, too restrictive for the treatment of all hospital waste materials.

By including in the term "treatment" as the adequate ways of disposal of Healthcare facility wastes, the following methods of treatment can be distinguished:

### **5.1 Special Incineration**

Incineration of both the infectious and the organic types of Healthcare facility waste is a recognised and proven method of eliminating their hazardous properties.

This method of treatment also has the advantages of great reduction of the waste volume and the gaining of calorific energy, which can be used for heating and steam production.

Various different technologies and patents for combustion are available on the market today, most of which are adequate.



## 5.2 **Sterilisation by Heat**

This type of waste treatment is generally performed in autoclaves by steam treatment at high temperatures. It is recommended for microbiological cultures from clinical or research laboratories, which should not leave the investigation area.

It is not adequate for the large total volume of Healthcare facility waste that needs treatment.

## 5.3 **Disinfecting by Steam**

Another type of thermal; treatment used for pathological waste is the application of heat at about 100<sup>0</sup>C, thus transforming infectious wastes into harmless residues.

The waste is collected in bags consisting of several layers of paper, with the inside reinforced by a layer of plastic. These bags are placed in a hermetically sealed chamber into which steam is pressed in order to inactivate the pathogens.

To ensure that the steam penetrates all parts of the charged waste, the air in the chamber is first evacuated to create a vacuum prior to admitting the pressurized stream. This process is repeated several times following a set pattern lasting approximately 25 minutes.

Once this treatment has been completed, the waste can be handled as household waste and disposed of in sanitary landfills.

## 5.4 **Microwave Disinfecting**

Another method used to disinfect clinical waste in stationary or mobile plants is heating it by microwave energy.

The waste material to be treated by microwaves must first be broken down and shredded to a certain size. As the microwave-process only works in the presence of water, and as clinical wastes are generally rather dry, the shredded waste mixture must be moistened beforehand by adding water and steam.

In a pipe-shaped screw conveyor, the shredded and dampened material is continuously transported under microwave generators to be heated by irradiation. The waste temperature to guarantee the temperature time schedule of decontamination regulates the screw conveyor speed.

### **5.5 Chemical Disinfecting**

There are many techniques for disinfection by chemical means, but none of them has been proven to be effective for treatment of hospital waste.

Equipment is available for shredding or granulating and then disinfecting waste by means of disinfectant liquid; however, its use is generally quite problematic, and there is no guarantee that the disinfectant liquid used will penetrate to all parts of the batch of waste undergoing treatment.

In addition, chemical liquids impose an additional burden on the environment, as chemical disinfectants themselves are inherently hazardous chemicals. Therefore, the use of chemical disinfectants may actually increase personal and environmental risks associated with the management of Healthcare facility wastes.

### **5.5 Controlled Disposal in Sanitary Landfills**

Human pathogens live and grow best in an environment that most closely resembles the conditions prevailing in the human body. Conditions in the exterior environment are, for the most part, not conducive to the survival and growth of human pathogens. Studies have demonstrated the rapid death of selected human pathogens after burial in a sanitary landfill, and indicate that land filling can be a satisfactory mechanism for the treatment and disposal of healthcare wastes.

For these reasons, infectious Healthcare waste of Type C can be buried in sanitary landfills if certain precautions are taken.

### **5.6 Burial in Cemetery or Incineration in Crematorium**

Healthcare wastes Type D, human body parts and placentas can be buried in certain areas of cemeteries or be incinerated in crematoria.

### **5.7 Chemical-Physical Treatment**

As far as the wastes included in Type E are concerned, discussion of details is dispensed with here, since these wastes are not restricted to Healthcare facilities and their management should be generally regulated by legislation covering industrial hazardous wastes.

Radioactive waste produced in healthcare establishments is of very low-level radioactivity and has a short-life. Residues should be stored safely until their radioactivity has decayed to the point that they are no longer considered radioactive, and then be disposed of according to their other characteristics (e.g. chemical, infectious or general) and in conformity with national regulations.

## **6.0 Instruction and Training of Personnel**

The technological advance which have been made in healthcare call for control of microbiological contamination and hospital infections to be interdisciplinary; in other words, involving not only the physicians, as in the past, but instead spanning an entire groups of professionals with different specialised tasks. Only in this way is it possible, for example, to prevent infections stemming from poor handling of waste. This aspect ought to be of great concern to all persons working in the field of medicine since it imposes additional problems on the basic task of treating patients in order to restoring their health.

Every Healthcare facility should implement and supervise training and maintenance programmes for the healthcare, maintenance and technical personnel. Doctors, paramedics and administrative healthcare personnel must, for example, know how to separate infectious and other hazardous waste from non-hazardous refuse and how to handle it.

Training of solid waste personnel should also be directed at the municipal collection and disposal services. Solid waste personnel on collection trucks or at disposal sites must be able to differentiate wastes by colour or other codes in order to handle each type properly. Programmes should include the following themes:

- Categories of healthcare waste and rapid assessment
- Segregation, storage and collection methods and equipment
- Treatment and disposal methods.

The general public needs to be informed about the risk associated with exposure to infectious healthcare wastes. This can be achieved by advocacy, seminars with groups, workshops, print media (flyers, posters, newspapers, etc), radio and television discussions and jingles.

## **7.0 Monitoring and Control**

Together with an appropriate legislation regulating waste management inside and outside the healthcare institutions and the installation of the appropriate infrastructure, an effective control system of the healthcare waste management must be established.

The control of the safe management of waste from healthcares facilities should be organised on two levels.

**Level 1**

Responsible self-control of the executing institutions by a qualified member of their own staff, both for the internal sanitary handling, as well as of the municipal services for the management outside the hospital, the collection, transportation, treatment and disposal.

**Level 2**

Public Health Inspectors of the Ministry of Health and Sanitation should be charged with official control, with the power of caution and sanction over all healthcare facilities.